# 1997-98 KIRIS ASSESSMENT
# Open-Response Item Scoring Worksheet

## Grade 5—Mathematics Question 12

The **academic expectations** addressed by "The Storytelling Club" (Question 12) are

2.11 Students understand mathematical change concepts and use them appropriately and accurately.

2.13 Students understand and appropriately use statistics and probability.

The **core content** assessed by this item includes

Skills

- Students should be able to find rules for patterns, extend patterns and create patterns.
- Student should be able to construct and interpret displays of data (e.g., line graph, bar graph, pictograph).

**The Storytelling Club**

Some students started a storytelling club at the beginning of the year, and the club has been growing ever since.

- 7 students came to tell stories at the first meeting, and 4 came to listen.
- 10 students came to tell stories at the second meeting, and 6 came to listen.
- 13 students came to tell stories at the third meeting, and 8 came to listen.
- 16 students came to tell stories at the fourth meeting, and 10 came to listen.

a. Use the grid in your Student Response Booklet to draw a graph showing the TOTAL NUMBER of students who attended each of the four meetings. Be sure your graph has proper labels.

b. Study the pattern shown in your graph. What is the TOTAL NUMBER of students that you think will come to the fifth meeting? Explain your answer.

# SCORING GUIDE
# Grade 5 Mathematics

| Score | Description |
|---|---|
| 4 | Student earns 4 points. One axis is labeled correctly. |
| 3 | Student earns 3 to 3½ points. |
| 2 | Student earns 1½ to 2½ points. |
| 1 | Student earns ½ to 1 point.<br>OR<br>Student shows minimal attempt to express data graphically or to determine the number to attend the next meeting. |
| 0 | Response is totally incorrect or irrelevant. |
| Blank | No response. |

**Score points:**

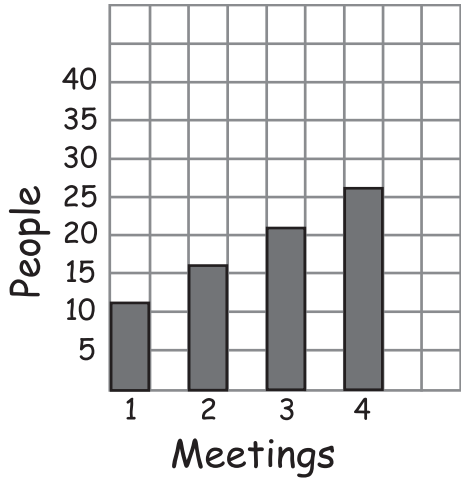
| | | |
|---|---|---|
| Part a: | 2 points | total number of students for each meeting plotted on correctly formatted graph, one axis labeled correctly<br>totals: 11, 16, 21, 26 |
| or | 1 point | shows some correct totals or representation other than totals with correctly formatted graph |
| or | 1 point | uses correct totals but graph has inconsistent or incorrect formatting or is difficult to interpret |
| Part b: | 1 point | correct total number of students (31) |
| or | $\frac{1}{2}$ point | determines correct number for each group (19 to tell stories and 12 to listen) |
| and | 1 point | explanation for determining number (add 5 for each meeting or add 3 story tellers and 2 listeners at each meeting.) |
| or | $\frac{1}{2}$ point | incomplete explanation (e.g., “add 3 storytellers”) |

# ANNOTATED STUDENT RESPONSE
## Grade 5 Mathematics

## Sample 4-Point Response of Student Work

### Student Response

Number of people who attended each meeting.




Student correctly graphs the total number of students who attended each meeting. Graph is correctly formatted with both axes labeled correctly.

Student correctly determines that a total of 31 students will attend the next meeting.

Student correctly explains that the total number of students attending each meeting increases by 5 each week.

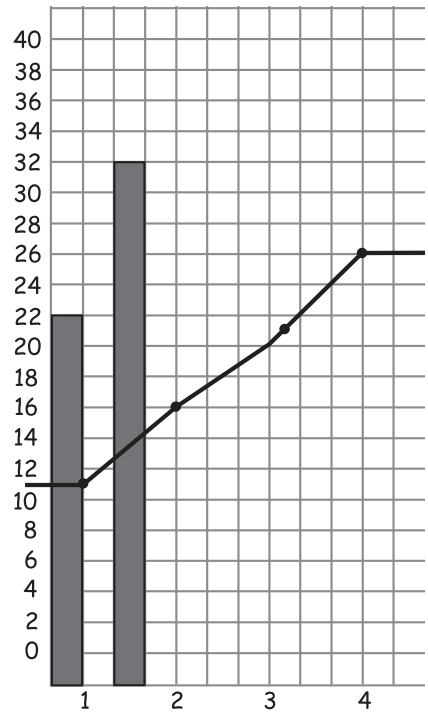
Overall, student earns a 4 by correctly graphing the total number of students who attended each of four meetings; correctly determining the total number of students who will come to the fifth meeting; and correctly explaining how the total number for the fifth meeting was determined.

# ANNOTATED STUDENT RESPONSE
## Grade 5 Mathematics

## Sample 3-Point Response of Student Work

### Student Response

a.




b. 31 people. 5 more people come each time.

Student uses a line graph to correctly show the total number of students who attended each meeting but some details are incorrect (e.g., the graph should not flatten out at the end) or missing (e.g., there is no axis label). Student's use of the bar graph is unclear.

Student correctly determines that a total of 31 students will attend the next meeting.

Student correctly explains that the total number of students attending each meeting increases by 5 each time.

Overall, student earns a score of 3 for graphing the correct totals, correctly determining the total number of students who will come to the fifth meeting, and correctly explaining how the total number for the fifth meeting was determined.

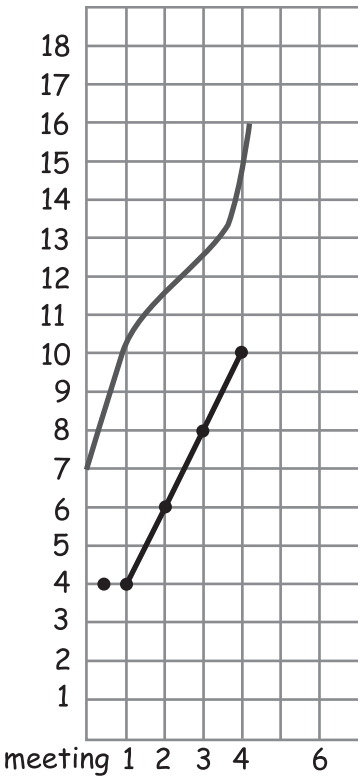
# ANNOTATED STUDENT RESPONSE
## Grade 5 Mathematics

## Sample 2-Point Response of Student Work

### Student Response

The Storytelling Club

a.




I think 19 story tellers will come and 12 people will come to listen because the story tellers keep increasing by three and the listeners keep increasing by 2. 2 more than ten is 12 and three more than 16 is 19.

Student correctly formats the graph and labels one axis correctly. Student does not graph totals but correctly graphs the number of storytellers and number of listeners attending each meeting.

Student correctly explains that the number of storytellers increases by 3 each meeting and the number of listeners increases by 2.

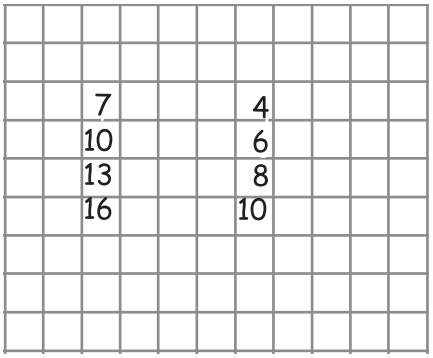
Student does not determine the total number of students that will attend the fifth meeting but correctly determines that 19 storytellers and 12 listeners will attend the fifth meeting.

Overall, student earns a score of 2 by correctly formatting the graph and showing some correct information on the graph; correctly determining the number of each group that will come to the fifth meeting; and correctly explaining why.

# ANNOTATED STUDENT RESPONSE
## Grade 5 Mathematics

## Sample 1-Point Response of Student Work

### Student Response




the next menting it will be 19 to tell a stroe and 12 well come to lesson.

Student uses the grid to display the data but does not draw a graph.

Student does not determine the total number of students who will attend the fifth meeting, but correctly determines that 19 storytellers and 12 listeners will attend the fifth meeting. Student does not explain why.

Overall, student receives a score of 1 for correctly determining the number of each group that will attend the fifth meeting.

# INSTRUCTIONAL STRATEGIES
## Grade 5 Mathematics

The open-response item "The Storytelling Club" assesses students' ability to (1) construct and interpret displays of data, and (2) identify, describe, and extend numerical patterns. The instructional strategies below present ideas for helping students explore and master these skills.

Review various methods for graphing data (e.g., line graph, bar graph, pictograph). Discuss how the different types of graphs are used to display different types of data.

Demonstrate how to format a graph correctly (e.g., choose an appropriate scale; correctly draw axes with labels).

Show students how to interpret data in graph form, using a variety of graphs as examples.

Demonstrate how to identify patterns, derive rules for patterns, and extend patterns. Use a variety of pattern sequences as examples.

Teach students a variety of strategies for organizing information (e.g., tables, charts, graphs, highlighting, underlining) that can be used to solve problems, make comparisons, or show relationships. Tell students that such strategies can help them write equations, check their reasoning and the reasonableness of their answers, document their thinking, and explain their work to others.

Model strategies for effectively communicating mathematical thinking both verbally and in writing.

Provide opportunities for students to work individually, in pairs, and/or in small groups to complete (with teacher support and guidance) any or all of the following activities:

- Look at different sets of data and identify the type of graph (e.g., line graph, bar graph, pictograph) that would best display each data set.
- Construct graphs for a variety of data sets, choosing scales and labeling the axes.
- Interpret, in writing, the meaning of graphed data. Interpret a variety of different types of graphs (e.g., line graphs, bar graphs, pictographs) that display a variety of data sets.
- Create, analyze and extend a variety of pattern sequences using both concrete models (e.g., pattern blocks) and representational models (e.g., 3, 6, 9; A, C, C, A).